A method of preparing cellulose ethers comprising the steps of:

What is claimed is:

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- obtaining mercerized and recovered cellulose pulp; and 2 (a) 3 (b) converting the mercerized and recovered cellulose pulp into 4 the cellulose ethers. 5 wherein the mercerized cellulose pulp in step (a) was mercerized with a cellulose II 6 mercerizing agent, the cellulose pulp is southern softwood kraft, the mercerized and recovered cellulose pulp has a TAPPI 230 om-89 viscosity of at most 12 cP, and when the 7 cellulose ether prepared is hydroxyethyl cellulose, the mercerized and recovered cellulose 8
 - (i) a TAPPI 230 om-89 viscosity less than 10.4 cP or greater than 11.2 cP,
 - (ii) a solubility in 10% sodium hydroxide as determined by ASTM D 1696-95 of greater than 2.3%,
 - (iii) a solubility in 18% sodium hydroxide as determined by ASTM D 1696-95 of greater than 1.3%,
 - (iv) not been prehydrolyzed, or

pulp has at least one of the following properties:

- (v) not been bleached with elemental chlorine.
- The method of claim 1, wherein the cellulose ether prepared is hydroxyethyl cellulose and the mercerized and recovered cellulose pulp has a TAPPI 230 om-89 viscosity less than 9.25 cP.
- 1 3. The method of claim 2, wherein the cellulose ether prepared is
 2 hydroxyethyl cellulose and the mercerized and recovered cellulose pulp has a TAPPI 230
 3 om-89 viscosity less than 8 cP.
- The method of claim 1, wherein the mercerized and recovered cellulose pulp has a TAPPI 230 om-89 viscosity less than 9.25 cP.
- The method of claim 4, wherein the mercerized and recovered cellulose pulp has a TAPPI 230 om-89 viscosity less than 8 cP.

	o. The method of claim 1, wherein the increenzed and recovered
2	cellulose pulp has a solubility in 10% sodium hydroxide as determined by ASTM D 1696-
3	95 of greater than 3.0%.
l	7. The method of claim 6, wherein the mercerized and recovered
2	cellulose pulp has a solubility in 10% sodium hydroxide as determined by ASTM D 1696-
3	95 of greater than 5.0%.
l	8. The method of claim 1, wherein the mercerized and recovered
2	cellulose pulp has a solubility in 18% sodium hydroxide as determined by ASTM D 1696-
3	95 of greater than 2.0%.
l	9. The method of claim 8, wherein the mercerized and recovered
2	cellulose pulp has a solubility in 18% sodium hydroxide as determined by ASTM D 1696-
3	95 of greater than 4.0%.
1	10. The method of claim 1, wherein the cellulose pulp is not
2	regenerated cellulose pulp.
1	11. The method of claim 1, wherein the mercerized and recovered
2	cellulose pulp is a cellulose floc.
	12. The method of claim 1, wherein step (a) comprises:
1	(i) mercerizing cellulose pulp; and
2	(ii) washing, neutralizing, or neutralizing and washing
3 4	the mercerized cellulose pulp.
4	the mercenzed centilose purp.
1	13. The method of claim 12, wherein the cellulose pulp in step (a)(i) is
2	mercerized with an aqueous solution containing from about 9 to about 24% by weight of
-	and item hydroxide based upon 100% weight of total squeous solution

1	14. The method of claim 13, wherein the cellulose pulp in step (a)(i) is
2	mercerized with an aqueous solution containing from about 13 to about 24% by weight of
3	sodium hydroxide, based upon 100% weight of total aqueous solution.
1	15. The method of claim 1, wherein step (a) comprises:
2	(i) mercerizing cellulose pulp; and
3	(ii) washing the mercerized cellulose pulp.
1	16. The method of claim 12, wherein the mercerized cellulose pulp in
2	step (a)(ii) is washed with an aqueous solution.
1	17. The method of claim 16, wherein the washing step is continued
2	until the residual water has a pH of less than about 10.
1	18. The method of claim 16, wherein step (a) further comprises (iii)
2	drying the mercerized and washed, neutralized, or washed and neutralized cellulose pulp.
1	19. The method of claim 18, wherein the mercerized and dried cellulose
2	pulp contains less than about 20% by weight of moisture content, based upon 100% weight
3	of total cellulose pulp and water.
1	20. The method of claim 1, wherein step (a) comprises:
2	(i) treating cellulose pulp to form a cellulose floc;
3	(ii) mercerizing the cellulose floc; and
4	(iii) washing, neutralizing, or neutralizing and washing
5	the mercerized cellulose floc.
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1	21. The method of claim 1, wherein the mercerized and recovered
2	cellulose pulp is substantially free of cellulose III

The method of claim 1, wherein the mercerized and recovered 1 22. cellulose pulp contains less than about 3.5% by weight of mercerizing agent, based upon 2 100% by weight of cellulose pulp and mercerizing agent 3 The method of claim 22, wherein the mercerized and recovered 1 23. cellulose pulp contains less than about 0.3% by weight of mercerizing agent, based upon 2 100% total weight of cellulose pulp and mercerizing agent. 3 The method of claim 23, wherein the mercerized and recovered 1 24. cellulose pulp contains less than about 0.03% by weight of mercerizing agent, based upon 2 100% total weight of cellulose pulp and mercerizing agent. 3 The method of claim 1, wherein the mercerized and recovered 25. 1 cellulose pulp has an Rx value of greater than 0.57. 2 The method of claim 25, wherein the mercerized and recovered 26. 1 cellulose pulp has an Rx value of greater than 0.60. 2 The method of claim 26, wherein the mercerized and recovered 1 27. cellulose pulp has an Rx value of greater than 0.64. 2 The method of claim 1, wherein the mercerized and recovered 1 28. cellulose pulp has at least about 20% by weight of cellulose II, based upon 100% total 2 weight of the crystalline portion of the mercerized cellulose pulp. 3 The method of claim 1, wherein the mercerized and recovered 29. 1 cellulose pulp has a total crystallinity of less than about 60% by weight, based on 100% 2 weight of total cellulose pulp. 3

mercerized cellulose pulp into the cellulose ethers via a cellulose floc intermediate.

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The method of claim 1, wherein step (b) comprises converting the

1	31. Th	e method o	f claim 30, wherein step (b) comprises:
2		(i)	treating the mercerized and recovered cellulose pulp
3	to form a cellulose floc;		
4		(ii)	alkalating the cellulose floc to form an alkali
5	cellulose; and		
6		(iii)	etherifying the alkali cellulose to form the cellulose
7	ethers.		
1	32. Th	e method o	f claim 31, wherein step (b)(i) comprises grinding,
2	dicing, or shredding the	mercerized	cellulose pulp to form the cellulose floc.
1	33. Th	e method o	f claim 31, wherein step (b)(ii) comprises treating the
2	cellulose floc with an alk	alating age	nt.
1	34. Th	e method o	f claim 33, wherein the alkalating agent is an alkali
2	metal hydroxide.		
1	35. TI	ne method o	f claim 31, wherein step (b)(iii) comprises reacting the
2	alkali cellulose with an e	therification	n agent to form the cellulose ethers.
1	36. TI	ne method o	of claim 35, wherein the etherification agent comprises
2	sodium monochloroaceta	ite.	
1	37. TI	ne method o	of claim 11, wherein step (b) comprises:
2		(i)	alkalating the cellulose floc to form an alkali
3	cellulose; and		
4		(ii)	etherifying the alkali cellulose to form the cellulose
5	ethers.		

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1		38.	The method of claim 1, wherein the cellulose ether is a
2	carboxymethy	l cellul	lose.
1 2	cellulose.	39.	The method of claim 1, wherein the cellulose ether is a methyl
1 2	ether.	40.	The method of claim 1, wherein the cellulose ether is a nonionic
1		41.	The method of claim 1, wherein the cellulose ether is an ionic ether
1 2	38.	42.	A carboxymethyl cellulose ether prepared by the method of claim
1		43.	A methyl cellulose ether prepared by the method of claim 39.
1		44.	A nonionic cellulose ether prepared by the method of claim 40.
1		45.	An ionic cellulose ether prepared by the method of claim 41.
1 2		46.	A method of preparing cellulose floc comprising the steps of: (a) obtaining mercerized and recovered cellulose pulp, and
3			(b) treating the mercerized pulp to form the cellulose floc,
4			e pulp is southern softwood kraft and the mercerized and recovered
5	cellulose pul	p is sub	stantially free of cellulose III and has a TAPPI 230om-89 viscosity of
6	at most 12 cF	·.	

47. The method of claim 46, wherein the mercerized and recovered cellulose pulp has a TAPPI 230 om-89 viscosity less than 10.4 cP or greater than 11.2 cP.

- 1 48. The method of claim 47, wherein the mercerized and recovered cellulose pulp has a TAPPI 230 om-89 viscosity less than 9.25 cP. 2 1 49. The method of claim 48, wherein the mercerized and recovered cellulose pulp has a TAPPI 230 om-89 viscosity less than 8 cP. 2 1 50. The method of claim 46, wherein the mercerized and recovered cellulose pulp has a solubility in 10% sodium hydroxide as determined by ASTM D 1696-2 95 of greater than 2.3%. 3 1 51. The method of claim 50, wherein the mercerized and recovered cellulose pulp has a solubility in 10% sodium hydroxide as determined by ASTM D 1696-2 3 95 of greater than 3.0%. 1 The method of claim 51, wherein the mercerized and recovered 2 cellulose pulp has a solubility in 10% sodium hydroxide as determined by ASTM D 1696-3 95 of greater than 5.0%. 53. The method of claim 46, wherein the mercerized and recovered 1 2 cellulose pulp has a solubility in 18% sodium hydroxide as determined by ASTM D 1696-3 95 of greater than 1.3%. 1 The method of claim 53, wherein the mercerized and recovered cellulose pulp has a solubility in 18% sodium hydroxide as determined by ASTM D 1696-2 3 95 of greater than 2.0%.
- 1 55. The method of claim 54, wherein the mercerized and recovered
 2 cellulose pulp has a solubility in 18% sodium hydroxide as determined by ASTM D 16963 95 of greater than 4.0%.

1	56.	The method of claim 46, wherein the mercerized and recovered
2	cellulose pulp has no	t been prehydrolyzed.
1 2	57. cellulose pulp has no	The method of claim 46, wherein the mercerized and recovered to been bleached with elemental chlorine.
1 2 3	58.	The method of claim 46, wherein step (a) comprises: (i) mercerizing cellulose pulp; and (ii) washing, neutralizing, or neutralizing and washing
4	the mercerized cellui	lose pulp.
1 2 3		The method of claim 46, wherein the mercerized and recovered ins less than about 3.5% by weight of mercerizing agent, based upon cellulose pulp and mercerizing agent
1 2 3		The method of claim 59, wherein the mercerized and recovered ins less than about 0.3% by weight of mercerizing agent, based upon f cellulose pulp and mercerizing agent.
1	61.	A cellulose floc prepared by the method of claim 46.
1 2	62. steps of:	A method of preparing mercerized cellulose floc comprising the
3		(a) mercerizing the cellulose floc; and
4		(b) recovering the mercerized cellulose floc,
5		ized and recovered cellulose floc is substantially free of cellulose III,
6		derived from southern softwood kraft, and the mercerized and
7	recovered cellulose	floc has a TAPPI 230 om-89 viscosity of at most 12 cP.
1	63.	The method of claim 62, wherein the mercerized and recovered

cellulose floc has a TAPPI 230 om-89 viscosity less than 10.4 cP or greater than 11.2 cP.

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1	64. The method of claim 63, wherein the mercerized and recovered
2	cellulose floc has a TAPPI 230 om-89 viscosity less than 9.25 cP.
	65. The method of claim 64, wherein the mercerized and recovered
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2	cellulose floc has a TAPPI 230 om-89 viscosity less than 8 cP.
1	66. The method of claim 62, wherein the mercerized and recovered
2	cellulose floc has a solubility in 10% sodium hydroxide as determined by ASTM D 1696-
3	95 of greater than 2.3%.
1	67. The method of claim 66, wherein the mercerized and recovered
2	cellulose floc has a solubility in 10% sodium hydroxide as determined by ASTM D 1696-
3	95 of greater than 3.0%.
1	68. The method of claim 67, wherein the mercerized and recovered
2	cellulose floc has a solubility in 10% sodium hydroxide as determined by ASTM D 1696-
3	95 of greater than 5.0%.
1	69. The method of claim 62, wherein the mercerized and recovered
2	cellulose floc has a solubility in 18% sodium hydroxide as determined by ASTM D 1696-
3	95 of greater than 1.3%.
1	70. The method of claim 69, wherein the mercerized and recovered
2	cellulose floc has a solubility in 18% sodium hydroxide as determined by ASTM D 1696
3	95 of greater than 2.0%.
1	71. The method of claim 70, wherein the mercerized and recovered
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2	cellulose floc has a solubility in 18% sodium hydroxide as determined by ASTM D 1696
3	95 of greater than 4.0%.

- 72. The method of claim 62, wherein the mercerized and recovered 1 cellulose floc has not been prehydrolyzed. 2 1 73. The method of claim 62, wherein the mercerized and recovered 2 cellulose floc has not been bleached with elemental chlorine. 74. A cellulose floc prepared by the method of claim 62. 1 A method of preparing cellulose ethers comprising the steps of: 1 75. selecting a desired viscosity for the cellulose ethers; 2 (a) 3 (b) obtaining mercerized and recovered cellulose pulp having the appropriate viscosity for yielding cellulose ethers having the selected viscosity; and 4 converting the mercerized and recovered cellulose pulp to 5 (c) 6 the cellulose ethers. wherein the mercerized and recovered cellulose pulp is substantially free of cellulose III, 7 the cellulose pulp is southern softwood kraft, and the mercerized and recovered cellulose 8 pulp has a TAPPI 230 om-89 viscosity of at most 12 cP. 9 The method of claim 75, wherein when the cellulose ether prepared 1 76. is hydroxyethyl cellulose, the mercerized and recovered cellulose pulp has a TAPPI 230 2 om-89 viscosity less than 10.4 cP or greater than 11.2 cP. 3 The method of claim 75, wherein the mercerized and recovered 1 cellulose pulp has a solubility in 10% sodium hydroxide as determined by ASTM D 1696-2 3 95 of greater than 2.3%.
- 1 78. The method of claim 77, wherein the mercerized and recovered
 2 cellulose pulp has a solubility in 10% sodium hydroxide as determined by ASTM D 16963 95 of greater than 3.0%.

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cellulose pulp has not been prehydrolyzed.

cellulose pulp has not been bleached with elemental chlorine.

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1	79. The method of claim 78, wherein the mercerized and recovered		
2	cellulose pulp has a solubility in 10% sodium hydroxide as determined by ASTM D 1696-		
3	95 of greater than 3.0%.		
1	80. The method of claim 75, wherein the mercerized and recovered		
2	cellulose pulp has a solubility in 18% sodium hydroxide as determined by ASTM D 1696-		
3	95 of greater than 1.3%.		
1	 The method of claim 80, wherein the mercerized and recovered 		
2	cellulose pulp has a solubility in 18% sodium hydroxide as determined by ASTM D 1696-		
3	95 of greater than 2.0%.		
1	 The method of claim 81, wherein the mercerized and recovered 		
2	cellulose pulp has a solubility in 18% sodium hydroxide as determined by ASTM D 1696-		
3	95 of greater than 4.0%.		
1	 The method of claim 75, wherein the mercerized and recovered 		

The method of claim 75, wherein the mercerized and recovered